

عنوان مقاله:

Modelling of Soil Displacement Resulting from Sweep during Tillage Operation Using Image Processing

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خلاصه مقاله:

The study of soil particles displacement through the passage of a tillage blade can lead to an appropriate geometrical design of soil-engaging tools, which can reduce the energy consumption required for tillage. In this study, soil displacement by a conventional sweep was measured and modelled. The sweep had a cutting width equal to 100 mm, and it was tested in an indoor soil bin containing a loam soil with 0.0% moisture content (dry basis) at a working depth of ۵. mm and a travel speed of .. IMM m s-1. Five pins with different colors were placed at the soil surface with a certain order in front of the sweep to model the interaction of soil and the soil-engaging part of the sweep. The pins movements were tracked for 1. seconds from the moment they were in touch with the sweep using a CCTV camera installed above the sweep. Experimental results showed a general trend of the highest displacements around the center of the path of sweep, reducing at further distance away from the center. The measured lateral displacement ranged from -1۶Y to +Y1 mm due to the displacements of the pins. Furthermore, a polynomial equation was fitted to the path of each pin. The extremum of these equations indicated the highest soil displacement in the paths. The method presented in this study can be used in designing problems where agricultural engineers can study the effects of .sweeps with different geometries on the trend of soil translocations during the tillage

كلمات كليدى: Geometry of tillage implements, Soil displacement model, Soil-tool interaction, Tillage sweep, Tracer method.

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